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EXAMINER

KAO, CHIH CHENG G

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 02/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/890,143

Applicant(s)

YAMAMOTO, MASAKI

Examiner

Chih-Cheng Glen Kao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☒ Claim(s) 2 and 4 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 July 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. The restriction requirement mailed 9/20/02 is withdrawn.

Drawings

2. The drawings are objected to because view numbers must be preceded by the abbreviation "FIG. " as needed in Fig. 1(a), Fig. 1(b), Fig. 2(a), Fig. 2(b), Fig. 3(a), Fig. 3(b), Fig. 8(a), Fig. 8(b), Fig. 8(c), Fig. 9(a), and Fig. 9(b).

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to because it is believed the lines in the graph of Fig. 6 are mislabeled. See Page 12, lines 4-11. It is believed that line (a) should be line (b) and vice versa in Figure 6.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

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4. The drawings are objected to because it is believed that the arrow on the left side of the dashed line in the graph of Figure 9, which is pointing to the left edge of the page, is pointing to nothing.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

5. The disclosure is objected to because of the following informalities: In the Brief Description of the Drawings, "Fig. 1(a)" and Fig. 1(b) are not mentioned. Corrections, similar to descriptions of Fig. 2(a) and Fig. 2(b) in the Brief Description of the Drawings", may obviate this objection. Appropriate correction is required.

6. The disclosure is objected to because of the following informalities: In the Brief Description of the Drawings, "Fig. 3(a)" and Fig. 3(b) are not mentioned. Corrections, similar to descriptions of Fig. 2(a) and Fig. 2(b) in the Brief Description of the Drawings", may obviate this objection. Appropriate correction is required.

7. The disclosure is objected to because of the following informalities: In the Brief Description of the Drawings, Fig. 8(a), Fig. 8(b), and Fig. 8(c) are not mentioned. Corrections, similar to descriptions of Fig. 2(a) and Fig. 2(b) in the Brief Description of the Drawings", may obviate this objection. Appropriate correction is required.

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8. The disclosure is objected to because of the following informalities: In the Brief Description of the Drawings, "Fig. 9(a)" and Fig. 9(b) are not mentioned. Corrections, similar to descriptions of Fig. 2(a) and Fig. 2(b) in the Brief Description of the Drawings", may obviate this objection. Appropriate correction is required.

Claim Objections

9. Claim 2 is objected to because of the following informalities. Claim 2 recites the limitation "the multilayer film" in line 1. There is insufficient antecedent basis for this limitation in the claim. This objection may be obviated by making claim 2 dependent from claim 1. The reasoning for this relates to the similarity in claim structure for claims 4 and 5. For purposes of examination, the claim will be treated as such. Appropriate correction is required.

10. Claim 4 is objected to because of the following informalities. Claim 4 recites the grammatical error "an refractive index" in line 4. This objection may be obviated by replacing "an" with - a- -. Appropriate correction is required.

11. Claim 4 is objected to because of the following informalities. Claim 4 recites the limitation "the incident rays" in line 1. There is insufficient antecedent basis for this limitation in the claim. This objection may be obviated deleting "the". Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1, 3, 12, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. (US Patent 5958605), which will be referred as '605, in view of Montcalm et al. (US Patent 6110607), which will be referred as '607. Montcalm et al. ('605) discloses an optical element with multilayer coatings of molybdenum and silicon for soft x-rays (col. 1, lines 19-25) and in microscopes and analyzers (col. 1, lines 60-65).

However, Montcalm et al. does not disclose multilayer films.

Montcalm et al. ('607) teaches multilayer films (col. 2, lines 48-55).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have films of Montcalm et al. ('607) with the device of Montcalm et al. ('605), since films and coatings are considered art-recognized equivalents known in the art as shown by Montcalm et al. (Title and col. 2, lines 48-55). Therefore, because these two elements were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute films for coatings. One would be motivated to provide films by thermal processing to reduce stress with minimal reflectance loss as implied from Montcalm et al. ('607) (col. 2, lines 48-52).

Note that the recitation in claim 1, "for controlling a phase and an amplitude of emerging rays", with respect to the manner in which a claimed apparatus is intended to be employed does

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not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

Secondly, the recitation in claim 1, "wherein a wavefront phase of the emerging rays is adjusted by cutting away the multilayer film in accordance with an amount of adjustment of the wavefront phase" is a method of forming the device. The method of forming the device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight. The patentability of a product does not depend on its method of production.

Thirdly, the recitation in claim 3, "the optical element is used for soft x-rays", with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

13. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605), in view of Montcalm et al. ('607) as applied to claim 1 above, and further in view of Murakami (US Patent 6160867).

For purposes of being concise, Montcalm et al. ('605) in view of Montcalm et al. ('607) suggests a device as recited above.

However, Montcalm et al. ('605) does not disclose a number of cycles larger than necessary to substantially saturate a reflectance.

Murakami teaches a number of cycles larger than necessary to substantially saturate a reflectance (col. 1, lines 20-25).

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It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the number of cycles of Murakami with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), since one would be motivated to have that many cycles to obtain as high an interface-amplitude reflectance as possible as implied from Murakami (col. 1, lines 20-25).

Secondly, it would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the number of cycles with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607) and Murakami, since where the general conditions of a claim are disclosed in the prior art, discovering the workable ranges involves only routine skill in the art. One would be motivated to have that many cycles to obtain as high an interface-amplitude reflectance as possible as implied from Murakami (col. 1, lines 20-25).

14. Claims 4, 6, 7, 20, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605) in view of Montcalm et al. ('607) and Murakami et al. (US Patent 6295164), which will be referred as '164, and Itoh et al. (US Patent 5319695).

For purposes of being concise, Montcalm et al. ('605) in view of Montcalm et al. ('607) suggests a device as recited above.

However, Montcalm et al. ('605) does not disclose a correction film of molybdenum on the multilayer film, which has a large difference between a refractive index n to incident rays and l as well as having a small extinction coefficient k to the incident rays.

Itoh et al. teaches a film of molybdenum on the multilayer film (Fig. 1, #2). Murakami et al. ('164) teaches molybdenum (col. 2, lines 29-35) as a correction film, which has a large

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difference between a refractive index n to incident rays and 1 as well as having a small extinction coefficient k to the incident rays (inherent).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the film of molybdenum of Itoh et al. with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), since one would be motivated to use molybdenum to help intensify reflections in a mirror with x-rays as implied from Itoh et al. (col. 2, lines 65-69, and col. 3, lines 1-6).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have molybdenum as a correction film of Murakami et al. ('164) with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607) and Itoh et al., since one would be motivated to use correct the thickness of molybdenum to ensure that the reflected light waves are in phase as implied from Murakami et al. ('164) (col. 2, lines 1-10).

Note that the recitation in claim 4, "for controlling a phase and an amplitude of emerging rays", with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

Secondly, the recitation in claim 4, "wherein a wavefront phase of the emerging rays is adjusted by cutting away the multilayer film in accordance with an amount of adjustment of the wavefront phase" is a method of forming the device. The method of forming the device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight. The patentability of a product does not depend on its method of production.

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Thirdly, the recitation in claim 6, "the optical element is used for soft x-rays", with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations.

15. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605), in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al. as applied to claim 4 above, and further in view of Murakami.

Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al. suggests a device as recited above.

However, Montcalm et al. ('605) does not disclose a number of cycles larger than necessary to substantially saturate a reflectance.

Murakami teaches a number of cycles larger than necessary to substantially saturate a reflectance (col. 1, lines 20-25).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the number of cycles of Murakami with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al., since one would be motivated to have that many cycles to obtain as high an interface-amplitude reflectance as possible as implied from Murakami (col. 1, lines 20-25).

Secondly, it would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the number of cycles with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), Itoh et al., and Murakami,

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since where the general conditions of a claim are disclosed in the prior art, discovering the workable ranges involves only routine skill in the art. One would be motivated to have that many cycles to obtain as high an interface-amplitude reflectance as possible as implied from Murakami (col. 1, lines 20-25).

16. Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. ('164), in view of Murakami et al. (US Patent 6377655), which will be referred as '655 and Murakami.

17. With regards to claim 8 and 10, Murakami et al. ('164) discloses a method of forming an optical element comprising the steps of forming a multilayer film on a substrate (Abstract, last 4 lines, and Fig. 1A) and smoothing the film in accordance with an amount of adjustment to control a difference between a plurality of material such as amplitude (col. 12, lines 48-55).

However, Murakami et al. ('164) does not disclose cutting adjustment to control a phase

Murakami et al. ('655) teaches cutting as equivalent to smoothing (col. 14, lines 55-65).

Murakami teaches controlling a phase (col. 1, lines 20-25).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have cutting of Murakami et al. ('655) with the control of phase of Murakami with the method of Murakami et al. ('164), which is explained with motivation as follows.

With regards to cutting, since Murakami et al. ('655) teaches the art-recognized equivalence of cutting and smoothing (col. 14, lines 55-65), it would have been obvious to

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substitute one type of method for the other. One would be motivated to having cutting to polish the mirror as implied from Murakami et al. ('655) for more reflectivity.

With regards to control of phase, one would be motivated to control thickness and thus phase of the wave for better matching and higher reflectance as implied from Murakami (col. 1, lines 20-26).

18. With regards to claim 9, Murakami et al. ('164), in view of Murakami et al. ('655), and Murakami suggest a method as recited above.

However, Murakami et al. ('164) does not disclose a number of cycles larger than necessary to substantially saturate a reflectance.

Murakami teaches a number of cycles larger than necessary to substantially saturate a reflectance (col. 1, lines 20-25).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the number of cycles of Murakami with the suggested method of Murakami et al. ('164), in view of Murakami et al. ('655), since one would be motivated to have that many cycles to obtain as high an interface-amplitude reflectance as possible as implied from Murakami (col. 1, lines 20-25).

Secondly, it would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the number of cycles with the suggested device of Murakami et al. ('164), in view of Murakami et al. ('655) and Murakami, since where the general conditions of a claim are disclosed in the prior art, discovering the workable ranges involves only routine

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skill in the art. One would be motivated to have that many cycles to obtain as high an interface-amplitude reflectance as possible as implied from Murakami (col. 1, lines 20-25).

19. Claims 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al. ('164), in view of Murakami et al. ('655), and Murakami, and Itoh et al. (US Patent 5319695).

For purposes of being concise, Murakami et al. ('164), in view of Murakami et al. ('655), and Murakami suggests a method as recited above. Murakami et al. ('164) also discloses molybdenum (col. 2, lines 29-35) as a correction film, which has a large difference between a refractive index n to incident rays and 1 as well as having a small extinction coefficient k to the incident rays (inherent).

However, Murakami et al. ('164) does not disclose molybdenum on the multilayer film.

Itoh et al. teaches a film of molybdenum on the multilayer film (Fig. 1, #2).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to have the film of molybdenum of Itoh et al. with the suggested method of Murakami et al. ('164), in view of Murakami et al. ('655), and Murakami, since one would be motivated to use molybdenum to help intensify reflections in a mirror with x-rays as implied from Itoh et al. (col. 2, lines 65-69, and col. 3, lines 1-6).

20. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605), in view of Montcalm et al. ('607) as applied to claim 1 above, and further in view of Ota (US Patent 6485153).

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Montcalm et al. ('605) in view of Montcalm et al. ('607) suggests a device as recited above.

However, Montcalm et al. ('605) does not disclose an exposure apparatus.

Ota teaches an exposure apparatus (Title and col. 14, lines 15-22).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the exposure apparatus of Ota with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), since one would be motivated to have an exposure apparatus with a mirror to reflect light based on the wavelength used as implied from Ota (col. 14, lines 15-22) and to direct light toward a wafer as seen in Figure 1.

21. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605), in view of Montcalm et al. ('607) as applied to claim 1 above, and further in view of Nakamura et al. (US Patent 5239566).

Montcalm et al. ('605) in view of Montcalm et al. ('607) suggests a device as recited above.

However, Montcalm et al. ('605) does not disclose a telescope.

Nakamura et al. teaches a telescope (Title and col. 3, lines 48-55).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the telescope of Nakamura et al. with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), since one would be motivated to have a telescope with a mirror for directing light in the optical equipment as implied from Nakamura et al. (col. 3, lines 48-55, and Fig. 1).

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22. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605), in view of Montcalm et al. ('607) as applied to claim 1 above, and further in view of Hawryluk (US Patent 5745286).

Montcalm et al. ('605) in view of Montcalm et al. ('607) suggests a device as recited above.

However, Montcalm et al. ('605) does not disclose a microprobe.

Hawryluk teaches a microprobe (col. 3, lines 55-60, and Fig. 4).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the microprobe of Hawryluk with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), since one would be motivated to have a microprobe with a mirror for directing light in the optical equipment as implied by Hawryluk at submicron resolution (col. 3, lines 50-60-55, and Fig. 4).

23. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605), in view of Montcalm et al. ('607) as applied to claim 1 above, and further in view of Fork et al. (US Patent 6028693).

Montcalm et al. ('605) in view of Montcalm et al. ('607) suggests a device as recited above.

However, Montcalm et al. ('605) does not disclose a laser oscillator.

Fork et al. teaches a laser oscillator (col. 5, lines 29-32, and col. 7, lines 45-55).

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It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the laser oscillator of Fork et al. with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), since one would be motivated to have a laser oscillator with the mirror so it will be highly reflective (col. 7, lines 60-65) and to controllably impart an adjustable delay to the photonic signal as implied from Fork et al. (Abstract, last 3 lines).

24. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605), in view of Montcalm et al. ('607) as applied to claim 1 above, and further in view of Spiller (US Patent 3887261).

Montcalm et al. ('605) in view of Montcalm et al. ('607) suggests a device as recited above.

However, Montcalm et al. ('605) does not disclose a Fabry-Perot interferometer.

Spiller teaches a Fabry-Perot interferometer (col. 6, lines 5-17).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the Fabry-Perot interferometer of Spiller with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), since one would be motivated to have a Fabry-Perot interferometer with the mirror so it will provide greatly improved performance over those possible with prior art and having higher peak transmission and smaller transmission bandwidth as implied from Spiller (col. 6, lines 5-17).

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25. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605), in view of Montcalm et al. ('607) as applied to claim 1 above, and further in view of Trozpek (US Patent 4954700).

Montcalm et al. ('605) in view of Montcalm et al. ('607) suggests a device as recited above.

However, Montcalm et al. ('605) does not disclose a ring laser gyro apparatus.

Trozpek teaches a ring laser gyro apparatus (col. 1, lines 13-25).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the ring laser gyro of Trozpek with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), since one would be motivated to have a ring laser gyro with the mirror in order to reflect light passing through a cavity of the ring laser gyro as implied from Trozpek (col. 1, lines 13-25).

26. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605), in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al. as applied to claim 4 above, and further in view of Ota (US Patent 6485153).

Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al. suggests a device as recited above.

However, Montcalm et al. ('605) does not disclose an exposure apparatus.

Ota teaches an exposure apparatus (Title and col. 14, lines 15-22).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the exposure apparatus of Ota with the suggested device of

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Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al., since one would be motivated to have an exposure apparatus with a mirror to reflect light based on the wavelength used as implied from Ota (col. 14, lines 15-22) and to direct light toward a wafer as seen in Figure 1.

27. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605), in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al. as applied to claim 4 above, and further in view of Nakamura et al. (US Patent 5239566).

Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al. suggests a device as recited above.

However, Montcalm et al. ('605) does not disclose a telescope.

Nakamura et al. teaches a telescope (Title and col. 3, lines 48-55).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the telescope of Nakamura et al. with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al., since one would be motivated to have a telescope with a mirror for directing light in the optical equipment as implied from Nakamura et al. (col. 3, lines 48-55, and Fig. 1).

28. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605), in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al. as applied to claim 4 above, and further in view of Hawryluk (US Patent 5745286).

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Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al. suggests a device as recited above.

However, Montcalm et al. ('605) does not disclose a microprobe.

Hawryluk teaches a microprobe (col. 3, lines 55-60, and Fig. 4).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the microprobe of Hawryluk with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al., since one would be motivated to have a microprobe with a mirror for directing light in the optical equipment as implied by Hawryluk at submicron resolution (col. 3, lines 50-60-55, and Fig. 4).

29. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605), in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al. as applied to claim 4 above, and further in view of Fork et al. (US Patent 6028693).

Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al. suggests a device as recited above.

However, Montcalm et al. ('605) does not disclose a laser oscillator.

Fork et al. teaches a laser oscillator (col. 5, lines 29-32, and col. 7, lines 45-55).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the laser oscillator of Fork et al. with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al., since one would be motivated to have a laser oscillator with the mirror so it will be highly

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reflective (col. 7, lines 60-65) and to controllably impart an adjustable delay to the photonic signal as implied from Fork et al. (Abstract, last 3 lines).

30. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605), in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al. as applied to claim 4 above, and further in view of Spiller (US Patent 3887261).

Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al. suggests a device as recited above.

However, Montcalm et al. ('605) does not disclose a Fabry-Perot interferometer.

Spiller teaches a Fabry-Perot interferometer (col. 6, lines 5-17).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the Fabry-Perot interferometer of Spiller with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al., since one would be motivated to have a Fabry-Perot interferometer with the mirror so it will provide greatly improved performance over those possible with prior art and having higher peak transmission and smaller transmission bandwidth as implied from Spiller (col. 6, lines 5-17).

31. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montcalm et al. ('605), in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al. as applied to claim 4 above, and further in view of Trozpek (US Patent 4954700).

Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al. suggests a device as recited above.

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However, Montcalm et al. ('605) does not disclose a ring laser gyro apparatus.

Trozpek teaches a ring laser gyro apparatus (col. 1, lines 13-25).

It would have been obvious to one having ordinary skill in the art at the time the invention was made, to have the ring laser gyro of Trozpek with the suggested device of Montcalm et al. ('605) in view of Montcalm et al. ('607), Murakami et al. ('164), and Itoh et al., since one would be motivated to have a ring laser gyro with the mirror in order to reflect light passing through a cavity of the ring laser gyro as implied from Trozpek (col. 1, lines 13-25).


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (703) 605-5298. The examiner can normally be reached on M - Th (8 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

gk
January 31, 2003


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